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FIGS. 32 and 33 are plan views corresponding to the diodes 100a and 100b, respectively. Except for a minor difference concerning connection between the P regions 5 and the anode P layers 3, the two plane structures are similar in that the P regions 5 each extend in a column-like shape. The plane configuration of the P regions 5, however, may be as shown in FIG. 34 wherein the anode P layers 3 each have an island-like shape and is surrounded by the P regions 5. This is acceptable because the first and the second zones Z1 and Z2 only have to be complementary to each other.

While the invention has been described in detail, the foregoing description is in all aspects illustrative and not restrictive. It is understood that numerous other modifications and variations can be devised without departing from the scope of the invention.

I claim:

1. A semiconductor device comprising:

- a first conductivity type first semiconductor layer;
- second conductivity type second semiconductor layers of a relatively high concentration, said second semiconductor layers being selectively formed in a top major surface of said first semiconductor layer;
- at least one third semiconductor layer of said second conductivity type having a relatively high concentration, said third semiconductor layer being selectively formed in said first semiconductor layer at a region between neighboring ones of said second semiconductor layers; and
- a second conductivity type fourth semiconductor layer of relatively low concentration, said fourth semiconductor layer being formed in said top major surface of said first semiconductor layer at a region between neighboring ones of said second semiconductor layers.

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2. The semiconductor device of claim 1, further comprising a first conductivity type fifth semiconductor layer of a higher concentration than the concentration of said first semiconductor layer, said fifth semiconductor layer being disposed under a bottom major surface of said first semiconductor layer.

3. The semiconductor device of claim 2, further comprising a first electrode which is disposed in contact with both said second semiconductor layers and said fourth semiconductor layer.

4. The semiconductor device of claim 3, further comprising a second electrode which is disposed under a bottom major surface of said fifth semiconductor layer.

5. The semiconductor device of claim 4, wherein a plurality of said third semiconductor layers are provided.

6. The semiconductor device of claim 1, wherein said second and said third semiconductor layers are connected to each other.

7. The semiconductor device of claim 6, wherein said third semiconductor layer has a column-like configuration.

8. The semiconductor device of claim 6, wherein said second semiconductor layers surround said fourth semiconductor layer in said major top surface of said first semiconductor layer.

9. The semiconductor device of claim 1, wherein said second and said third semiconductor layers are separated from each other.

10. The semiconductor device of claim 9, wherein said third semiconductor layer has a column-like configuration.

11. The semiconductor device of claim 9, wherein said second semiconductor layers surround said fourth semiconductor layer in said major top surface of said first semiconductor layer.

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